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eral reader, treating as it does of the habits of insects and giving little or nothing in regard to the dry details of anatomy. The author attempts here particularly to describe the industrial habits of animals, more particularly those of social animals. He describes the methods of hunting and the methods of carrying of war and the general methods of defence of animals. He gives an account of the various habits possessed by animals of obtaining and storing provisions, describing the habits of gardening ants and agricultural ants, and giving an account of the slavery that exists among certain species of ants as well as their habits of "cattle keeping." He gives an account of the methods for rearing the young; of the methods of building houses and of the material and architecture of the dwellings of various animals; discusses habits of sanitation and defence against diseases. This account is extremely entertaining reading and is full of the most striking incidents. The preacher will find anecdotes for illustration; the lecturer find examples to enliven his lectures; the psychologist will find many facts to ponder over and explain, and every one will find much to interest and to wonder about, so that, on the whole, a more readable book on entomology can hardly be mentioned.

The last of the four has quite a different scope and is of a more technical scientific character. The fact that this is one of the International Scientific Series is enough to determine its high character. The author aims to give in this book a complete account of the higher crustacea (Malacostraca). He was unfortunately, however, obliged to leave out the description of the Amphipoda, since the space assigned to him would not admit of their treatment. This book begins with a careful description of the general anatomy of the crustacean groups, with an outline of their classification. This part of the book is, unfortunately, not illustrated by figures, so that it will be hardly intelligible to one not acquainted with the material beforehand. Then there follows, in separate chapters, descriptions of the various orders, tribes and families of the crustacea and a short account of all of the important genera. Numerous illustrations of more common species

are given throughout the book, and the descriptions and history of the different genera will prove of especial value. This volume of the International Scientific Series is an especially valuable book for a student wanting a thorough knowledge of crustacea, for it will enable him to determine the general character and relations of any crustacea which he may find, and in many cases enable him to determine any species at hand, although it does not pretend to be a systematic account of the crustacea. Even a more valuable book will it be for a reference library book. Unlike the other three books above given, this one can hardly be regarded as a readable book, but must be looked on as a work for reference. As such a book it will find a valuable place in the libraries of all students of zoölogy.

Elementary Palaeontology for Geological Students. By HENRY WOODS, B. A., F. G. S. Cambridge, University Press. 222 p., \$1.60.

This little book is a text-book, designed for the student to use with specimens of fossils in his hands. It gives the general characteristics of the groups of animals important to the palaeontologist and a brief description of the most important genera of fossils. It gives also at the close of the discussion of each group an outline history of the group in the past. The book is of value as a guide to a student who has access to a good collection of fossils; but having almost no figures of fossils in it, it is of no use for any other purposes. It is not designed, indeed, for any other purpose, but the geological student will find it a convenient handbook to carry into a museum for reference and study.

—Messrs. Macmillan & Co., of New York, announce for January, 1894, in their "Book Reviews": "The Study of the Biology of Ferns by the Collodion Method; for Advanced and Collegiate Students." By Geo. F. Atkinson, Ph. B., Associate Professor of Cryptogamic Botany, Cornell University. Profusely illustrated. The book is designed for laboratory instruction and for reference on the development and structure of ferns. It consists of

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two parts—Part I. is descriptive and deals in full with the life-history of ferns; Part II. deals with methods of study. The descriptive portion of the work is arranged in seven chapters, six chapters being devoted to the Leptosporangiate homosporous Filicinæ, and one chapter to the Ophioglossaceæ. The chapters on the ferns trace in detail the development, morphology and anatomy of the gametophytic and sporophytic phases. The text is in no sense a compilation, but is written after a thoroughgoing and serious investigation by the author, using the Collodion Method as a means of bringing the material under contribution, so that in a very large measure it is written from nature revealed by original preparations. One unique feature of the work is the result of a critical examination by the author of the structure of the sporangium in the different orders of ferns and the dispersion of the spores. In the light of this study it is clearly shown that the customary statements regarding the extent of the annulus must be modified. The 163 illustrations are all original from camera lucida sketches, accompanied by a magnified micrometer scale, so that the reader can at once compute the magnification. All of the illustrations of sections are from objects prepared by the Collodion Method, and several of them from preparations made by students of the author during their ordinary laboratory work. The old method of free-hand sectioning rendered it an extremely difficult task even for an expert to make satisfactory sections of the delicate prothalline tissue. The profuse illustrations in this book, representing, as they do, the entire range of development, the chief features of anatomy and a comprehensive treatment of the structure of the sporangia of the different orders, are evidence of the comparative ease with which students may now, by this method, overcome obstacles which heretofore have stood in the way. From the intermediate position which ferns occupy in

the plant kingdom their life-history presents a generalized view of the chief phenomena of plant life, and they are therefore admirably suited for studies of the biological aspect of botany, and form a suitable introduction to this phase of botanical instruction. The book is suited to assist students in laboratory classes in successfully tracing out the more difficult phases in the development of fern organs. The descriptive part affords a convenient means of reference at any step of the work, while the practical part deals with methods, preparation of material and instructions for prosecuting the various phases of the investigation, and is to be used as a laboratory guide. By its use, as first tested by the author in his own classes, the students are enabled to make with precision and accuracy permanent microscopic preparations of all the stages of development. Especial success has been had in adapting the collodion method to the handling of the delicate prothalline tissue, sexual organs and embryo, it being better suited to such delicate tissue than the paraffin method, and the preparation of material can be carried through in less time and with far less trouble. Permanent microscopic sections thus made serve the purpose of study, for future reference, and, if desired, for class illustration. The descriptive part occupies such a prominent part of the book that it will commend itself also to those who do not contemplate the practical study, but desire, in compact form, a much fuller account of fern history than can be obtained in ordinary text-books.

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CHEMIST.—Graduate of a polytechnical school, and studied photographic chemistry in Germany and Austria. Situation teaching or in analytical or experimental laboratory. M. B. Punnett, Rochester, N. Y.